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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/091,833	03/05/2002	Richard D. Smith	E-13183	8561

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EXAMINER

KALIVODA, CHRISTOPHER M

ART UNIT PAPER NUMBER

2881

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/091,833

Applicant(s)

SMITH ET AL.

Examiner

Christopher M. Kalivoda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☒ Claim(s) 4 and 7 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

DETAILED ACTION

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 2b shows references to two turbos and two root pumps; however, there is no reference to these devices in the specification. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: The equation labeled as equation (4) on page 9, line 24 of the specification should be labeled as equation (5). Appropriate correction is required.

Information Disclosure Statement

The information disclosure statement filed on October 18, 2002 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. Specifically, U.S. Patent No. 6,107, 628 was not included in the attachments with the IDS.

Claim Objections

Claims 4 and 7 are objected to because of the following informalities: Claim 4 contains an extra period (".") at the end of the sentence. Claim 7 is missing a period (".") at the end of the sentence. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 – 16 are rejected under 35 U.S.C. 102(a) as being anticipated by Tang, et al. in the publication "Generation of Multiple Electrosprays Using Microfabricated Emitter Arrays for Improved Mass Spectrometric Sensitivity", Analytical Chemistry, April 15, 2000, Vol 73, No. 8, American Chemical Society. Regarding claims 1 and 9, Tang, et al. clearly anticipate a method of increasing total ion current produced from a liquid sample introduced into a mass spectrometer comprising the steps of:

- a. providing an array of spray of emitters (see page 1659, para 1, line 1-3, fig 1a);
- b. providing said liquid sample in at least one reservoir formed on one side of said array (see page 1659, para 4, line 1-2, bottom right of page);
- c. interfacing the opposite side of said array with the entrance to a mass spectrometer (see fig 2a);

d. forming an electrospray of said liquid sample at each opposite side of each emitter in said array (see fig 3);

e. directing said electrosprays into said entrance of said mass spectrometer (see fig 2a);

Regarding claims 2 and 10, Tang, et al. clearly anticipates the entrance to the mass spectrometer is provided as a multi-capillary inlet (see fig 2a).

Regarding claims 3 and 11, Tang, et al. clearly anticipates the array of spray emitters is provided as fabricated on a single chip (see page 1659, para1, line 1-3, fig 1a).

Regarding claims 4 and 12, Tang, et al. clearly anticipate the chip is fabricated by a method selected from the group consisting of laser etching, photolithographic patterning, wet chemical etching, laser ablation, plasma etching, casting, injection molding, and hot and cold stamping (embossing) (see page 1659, para1, line 1-3).

Regarding claims 5 and 13, Tang, et al. clearly anticipate the chip is fabricated from materials selected from the group consisting of polycarbonate, polyamide, polymethylmethacrylate, polyoxymethylene, cycloolefin, copolymer, polyethylene, polypropylene, polystyrene, plastic, glass, silicon, and combinations thereof (see page 1659, para1, line 1-3).

Regarding claims 6 and 14, Tang, et al. clearly anticipate the reservoirs are interfaced with a liquid separation device (page 1659, para 4, line 2-3, bottom right of page).

Regarding claims 7 and 15, Tang, et al. clearly anticipate the liquid separation devices are selected from the group consisting of capillary electrophoresis devices, capillary isoelectric focusing devices, micro liquid chromatography, and nano column separation devices (see page 1658, para 2, line 3-6).

Regarding claims 8 and 16, Tang, et al. clearly anticipates the step of enhancing the hydrophobicity of the array by treating the surface with CF₄ rf plasma (see page 1659, para 3, lines 2-5).

In addition to the cited reference and rejections above, the following rejections are made:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the

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treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 3-7, 9, 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Corso, et al., U.S. 2002/0000517. Regarding claims 1 and 9, Corso, et al. clearly anticipate a method of increasing total ion current produced from a liquid sample introduced into a mass spectrometer comprising the steps of:

- a. providing an array of spray of emitters (see para 0130, lines 1-3 and fig 1a);
- b. providing said liquid sample in at least one reservoir formed on one side of said array (see para 0130, lines 7-13);
- c. interfacing the opposite side of said array with the entrance to a mass spectrometer (see para 0167, lines 1-6);
- d. forming an electrospray of said liquid sample at each opposite side of each emitter in said array (see para 0130, lines 13-14);
- e. directing said electrosprays into said entrance of said mass spectrometer (see para 0167, lines 1-6). This is because the electrospray device can be integrated with a mass spectrometer described in item c above;

Regarding claims 3 and 11, Corso, et al. clearly anticipates the array of spray emitters is provided as fabricated on a single chip (see para 0128, lines 3-7).

Regarding claims 4 and 12, Corso, et al. clearly anticipate the chip is fabricated by a method selected from the group consisting of laser etching, photolithographic patterning, wet chemical etching, laser ablation, plasma etching, casting, injection molding, and hot and cold stamping (embossing) (see para 0169, lines 1-6).

Regarding claims 5 and 13, Corso, et al. clearly anticipate the chip is fabricated from materials selected from the group consisting of polycarbonate, polyamide, polymethylmethacrylate, polyoxymethylene, cycloolefin, copolymer, polyethylene, polypropylene, polystyrene, plastic, glass, silicon, and combinations thereof (see page 1659, para1, line 1-3).

Regarding claims 6 and 14, Corso, et al. clearly anticipate the reservoirs are interfaced with a liquid separation device (see para 0164, lines 8-14). Here, the backside of the chip, which houses the reservoir, is bonded to the separation device.

Regarding claims 7 and 15, Corso, et al. clearly anticipate the liquid separation devices are selected from the group consisting of capillary electrophoresis devices, capillary isoelectric focusing devices, micro liquid chromatography, and nano column separation devices (see para 0164, lines 8-14).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corso, et al., U.S. 2002/0000517 in view of Fuhrer, et al., U.S. 2001/0032929. Corso, et al. completely describes the invention as described in claim 1, sections a - e above. However, this reference is silent with respect to the entrance mass spectrometer being provided as a multi-capillary inlet.

Fuhrer, et al. describes a method in which a Time of Flight mass spectrometer (TOFMS) entrance is provided as a multi-capillary inlet (see para 0006, line 12-18 and Fig 1 and para 0107, line 1-6, Fig 1 and Fig 23, ref sign 1). In figure 23, the TOFMS is seen represented by reference sign 2 and the multi-capillary inlet is seen as reference sign 1.

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to place a multi-capillary inlet at the entrance to the mass spectrometer described by Corso, et al.

The motivation for such an improvement would be to use the capillary-inlet as a pressure stop and ion interface in order to reduce the vacuum pumping requirements (see Fuhrer, et al, para 0107, lines 9-12).

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Corso, et al., U.S. 2002/0000517 in view of Gleim, et al. U.S. Patent 4,524,121 and further in view of Oka, et al. U.S. Patent 4,898,775. Corso, et al completely describes the invention as described in claim 1, sections a - e above. However, this reference is silent with respect to enhancing the hydrophobicity of the array by treating the surface with a CF₄ rf plasma.

Gleim, et al. describes methods of treating a surface with a CF₄ rf plasma in semiconductor processing (see column 4, lines 29 – column 5, line 1-5).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to treat the surface with a CF₄ rf plasma.

The motivation for such an improvement to treat the surface with a CF₄ rf plasma would be to produce a directional etch and enable definitions of geometries smaller than those attainable with isotropic etchings. These types of etchings (isotropic) are the results of typical wet etching techniques (see column 4, line 37 – 40 and column 5, lines 2-5).

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Furthermore, Oka, et al. indicates it is well known to fluorinate surfaces of polymers by plasma treatments using CF_4 (see column 2, line 16-28). The reason to fluorinate the surface would be to render the surface hydrophobic by the introduction of fluorine atoms. Therefore, an added benefit to the motivation cited above is to render the surface more hydrophobic.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Kalivoda whose telephone number is (703)-305-7443. The examiner can normally be reached on Monday - Friday (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (703)-308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9318 for regular communications and (703)-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)-308-0956.


JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

cmk
January 17, 2003